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HYDRO ELECTRIC
POWER COMMISSION
OF ONTARIO

The BULLETIN

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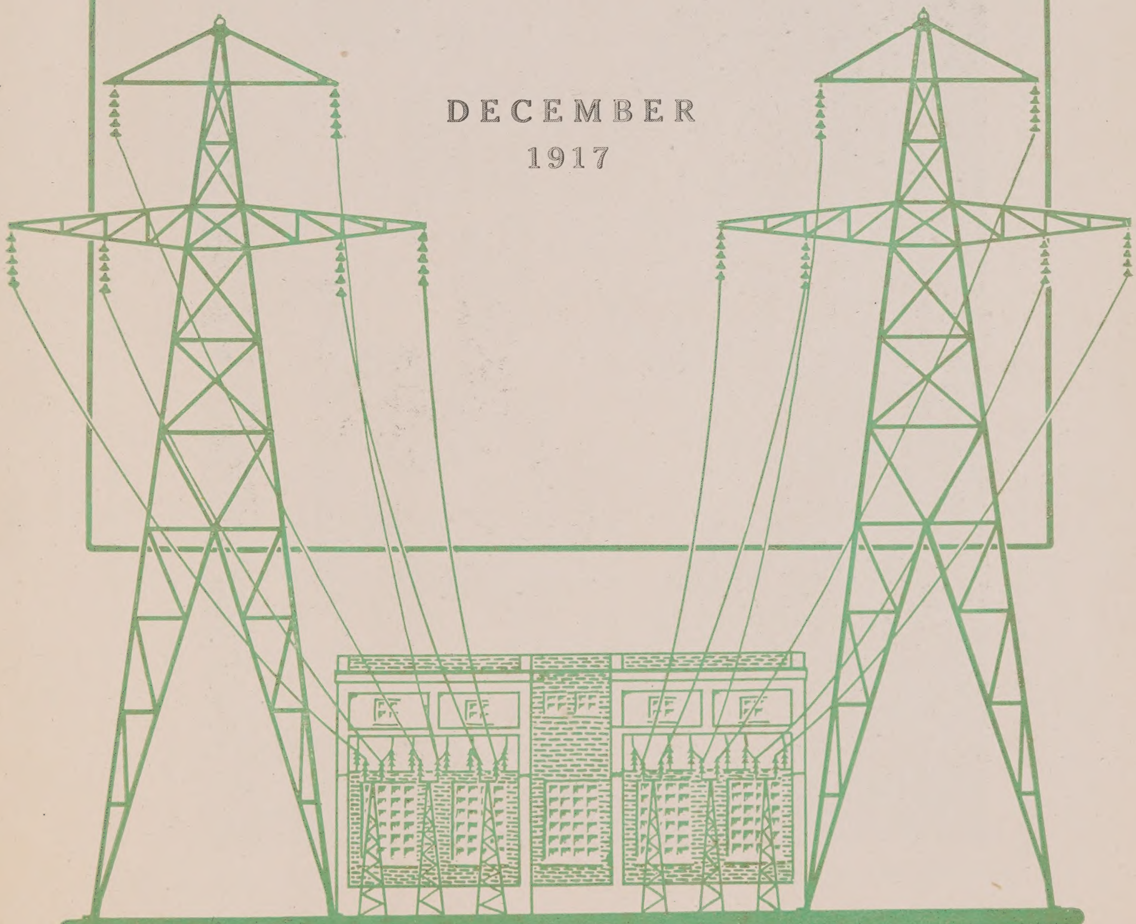

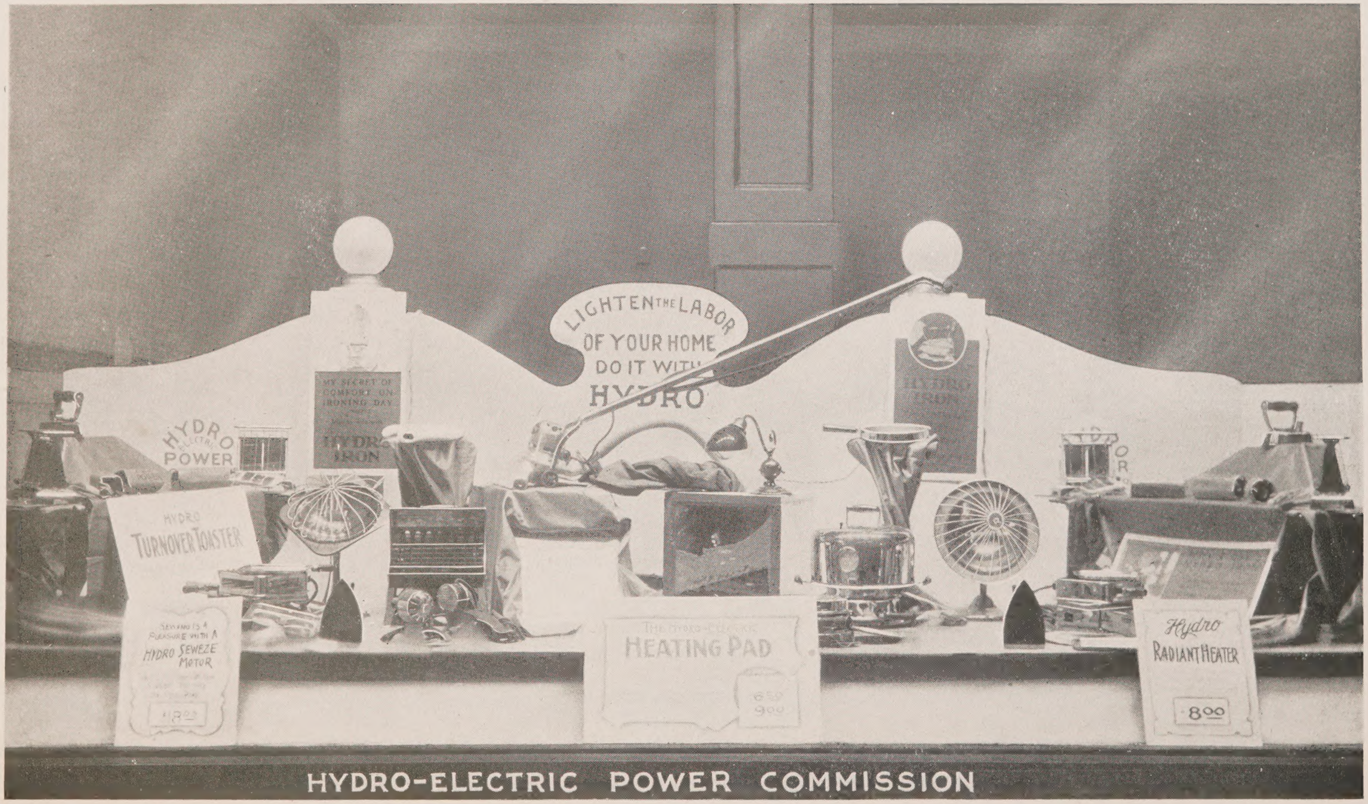

New window display installed at Lindsay by the local Hydro office. The background is a form especially recommended for its ease of construction and effective simplicity

EDITORIAL

Of What Value is Advertising to You?

THERE is nothing mysterious about the force of advertising. Contrary, to perhaps general belief, advertising men are not born and especially adapted for this line of work. As more and more advertising successes are recorded, it is more and more evident that they are based on the fundamentals of good business principles, and that a complete knowledge of the goods advertised and of the facts connected with their sale has played a far more important part in the success achieved, than has any brilliant idea or any catch phrases in the advertising itself.

Advertising which takes human nature into account is the most successful. Sir Thomas Lipton has been and is one of the most successful advertisers, and in the first campaign he ever put on, he had human nature strongly in mind when he played to the inquisitiveness of the people to whom he wished to sell. The story goes that Lipton at the age of twenty-two and with ten shillings his only capital arrived in Edinburgh after working round the docks in New York City.

Making friends quickly he saw an opportunity and was able to get credit on the purchase of 200 hams and 100 sides of bacon, which he placed in an old warehouse on three days' rental. Lipton next advertised for the six thinnest and the six fattest men in Scotland. He bought a few yards of muslin, some wooden strips, and some paint and brushes, he took from his applicants six tall men as thin as bean poles, and six fat men just about able to waddle. He painted two signs, one read "Going To Liptons," the other "Coming From Liptons." He started out the thin squad first carrying the "Going To Liptons" placard. They marched through the principal streets of Edinburgh and were soon followed by a crowd which grew into thousands. The procession, of course, ended at the warehouse where the hams and bacon were in stock. Concealed in the building were the six fat men. At the end of an hour the crowd having increased largely, the roly poly contingent emerged and went over the same route as their predecessors, but they were carrying the "Coming From Liptons" sign. The audacity of the scheme

worked on the conservative Scotchmen, and Lipton sold out his ham and bacon in the one day at a good profit, which is said to have been the foundation for his future fortune, made in tea.

No one can estimate the great increase in the sale of all kinds of goods since advertising has become a business force. It is wrong to sell a man something he does not want or cannot use. It is not wrong, however, to interest a man in and to sell him something that previously he may not have realized could help him, or give him pleasure or comfort. That is rendering a service to the buyer as well as making a profit for the seller, and advertising has made both possible.

Advertising takes many forms. "A satisfied customer is the best advertisement" is still as true as ever. The customer may derive much of his satisfaction from the courtesy and attention he receives when buying the goods.

Very few electrical appliances would be sold if it were not for advertising of some nature or other. The public has not asked for these devices. Experts have invented and manufactured them, and salesmen and advertising men are educating the public that there is something that the public can use to its advantage.

The greater the number of appliances you sell the greater service you are rendering to the people of your locality. And this service will very likely be in direct proportion to the advertising and selling methods you employ.

We cannot too strongly urge the use by you of the advertising material issued from time to time by the Commission, and the adoption of the sales, advertising, window display, suggestions, etc., offered from time to time in the Commercial Section. Not all of these helps and ideas will be applicable to your situation, but all of the plans are sound and based on good business, and some of them, sometime, should help you to build a bigger business and to render greater service in your community.

The Installation of Electric Ranges

By W. J. Jackson

Meter and Wiring Superintendent, London Public Utilities Commission

CONSIDERABLE experience has been gained by the wiring department of the London "Hydro" in the installation of electric cooking ranges and it is thought that a few notes on this work might be helpful to others.

All ranges are sold by the London Hydro Shop at a price installed, and it has been determined from experience that the average cost is $25 for wiring. This has been found to be the most satisfactory method of selling ranges as it avoids estimating for every case and enables the salesman to close a contract at once by having a definite price to quote.

The main points to be remembered in wiring are: (1) that the service should be located as near the range as possible; (2) that the service wires and other equipment are of ample capacity for future expansion; (3) that the original lighting wires are rearranged so that the whole load is on one meter.

Location of Service

As the kitchen is invariably at the rear of a house it follows that the service conduit should be installed near the back in order to reduce the cost of inside work, this of course increases the cost of the line work where the house is supplied from the street in front, which is unfortunately the most common condition, but the total cost is less as outside work is much cheaper than inside wiring. There is also the further argument for this location of service that the unsightly pipe is not noticeable from the front while the overhead service wires are above the range of vision. It is therefore standard practice to locate the entrance switch and meter in the basement as nearly beneath the range as possible, the service pipe rising directly above outside.

Size of Service Wires

These may vary from three No. 12 wires to half-inch conduit to three

No. 8 wires in three-quarter-inch conduit. The smallest cooking apparatus that is classed as a range is rated at about 15 amperes. A service of No. 12 wires has a capacity of 20 amperes and is therefore ample for houses in which these small ranges are usually installed. The medium size ranges are rated at about 20 amperes three-wire and stove and lighting are fed from a service of three No. 10 wires in ¾-inch conduit. The large size ranges take 30 amperes three-wire, and are supplied from three No. 8 wires in ¾-inch conduit. These latter services will supply stove, lighting and usual appliance load, in all but the largest residences. If there is a prospect of the consumer using electric grates or water heaters, he is advised to have a service of three No. 6 wires or larger installed and pay the difference in cost usually amounting to about $5 for the No. 6 wire.

Some trouble should be taken to impress on the customer that the service should be heavy enough in the first place even if he has to pay a little extra for it. It is a comparatively simple matter to wire in an extra circuit or two in a house where the service wires are heavy, but if any increase in load means a change of service it becomes rather expensive. As the stove load is usually unbalanced, care should be taken to see that the lighting in the house is connected to the side having the smaller demand.

Rearranging Wiring to Take All Load on One Meter

This was not done at first because both customer and commission were anxious to know exactly how much current the electric range consumed, but as the maintenance of two meters was a costly matter, it was decided that in every case where possible, only one meter would be used. As records of the consumption of ranges in different sized families were available, for the inspection of prospective customers, a second meter would be installed only on payment of a rental of 25 cents per month. Various plans have been followed for combining the two loads on one meter, the simplest being where a conduit lighting service can be replaced by a conduit stove service. This happens very seldom, however, as usually when a house is wired an electric stove is not given any consideration and the service location is not suitable for stove connection, and so connection from the new stove service to the lighting system, has to be made in whatever way is most feasible. Sometimes a two or three-wire circuit is installed connecting directly to the lighting cut-outs installed at the new service entrance. One difficulty often encountered in connecting old lighting to a three wire supply is where duplex switches have been connected double pole to save wiring, one switch being on a downstairs circuit and the other on the upstairs, when it sometimes happens that the light controlled by these switches gets 220 volts if the circuits are connected on opposite sides of a three-wire supply.

Frequently the lighting cut-outs are in the attic and supplied by the old style overhead service. Sometimes it is possible to run a two or

three-wire circuit up partitions in loom from basement to attic. In other cases the circuit is run outside in conduit.

All work necessary to centralize the load on one meter involves considerable expense, but even should the wiring expense equal the cost of an additional lighting meter the department would gain enough by the saving in meter reading and office work to justify the expenditure. Usually the more difficult change the greater the advantage when completed, as the lighting meter in the old location might be almost inaccessible.

As to methods of connecting the stoves, the elements are almost invariably protected by individual cutouts so no fuses other than those at the entrance are needed unless larger wire is used between the entrance and the distribution blocks than between the distribution blocks and the stove. Wires supplying the stove were originally brought up from the basement through the floor in tubes, but this practice has been discarded and conduit is now used instead. It very frequently happens, however, that the feed wires can be run up a partition or wainscoting in loom and brought out opposite the connections on the stove.

In conclusion prospective lighting customers should be advised to have their service pipe and wires large enough and in such a location as to make the installation of an electric range possible without any alterations.

Appended are a number of bills showing the cost of various types of stove installations.

Dec. 2nd., 1916.

MR. T. H. BAKER,
286 Central Ave.,
City.

¾ Service and conduit continued to stove, lighting supplied by a two wire circuit in ½″ Conduit outside house up to attic.

¾ Service and conduit continued to in ½″ Conduit outside house up to attic.

Stove Installation Only

1	¾″ F Condulet......	.25	
1	¾″ C Condulet.....	.15	
1	¾″ L L Condulet....	.18	
2	¾″ L.R. Condulet...	.35	
2	¾″ L B Condulet....	.35	
5	¾″ B M Covers.....	.23	
2	¾″ 3-hole Porc. C'vrs	.22	
1	¾″ 4-hole Porc. C'vrs	.12	
1	¾″ x 3″ Nipple.....	.05	
1	¾″ x 2″ Nipple.....	.02	
3	¾″ Locknuts.......	.03	
1	¾″ Bushings........	.02	
9	¾″ Pipe Straps.....	.09	
36	Ft. Conduit.........	2.70	
1	1″ Locknut.........	.02	
1	1″ Bushings.........	.04	
142	Ft. No. 8 D.B. Wire..	5.35	
10	Ft. No. 10 R.C. Wire	.21	
1	60 A. 250 V Det. Box	5.45	
2	35 A. 250 V Fuses....	.26	
1	Ground Clamp......	.09	
1	Lb. Asbestos........	.06	
			$16.24
	Time 9 hrs. Labor at..	.38	
	" 8 " "	.26	
	Inspection Fee.........	.60	6.10
			$22.34

Connecting Lighting to New Service

1	½″ F Condulet......	.25	
1	½″ Locknut.........	.01	
1	½″ Bushing.........	.02	
4	½″ Pipe Straps.....	.02	
1	½″ x 2″ Nipple.....	.04	
1	10″ x 6″ x 4″ Iron Box	.35	
1	3-2 D.B. Cut-out....	.42	
2	25 A Fuse Plugs.....	.08	
2	Lbs. No.10 W.P. Wire	1.00	
		2.19	

CREDIT

45 Ft. No. 12 R.C. Wire	.01		
20 Ft. ½″ Conduit....	.06	1.65	
			.54
Time 3½ hrs. Labor at	.38		
" 3½ " " at	.26		3.24
			$26.12

May 15, 1917.

Mr. Short,
1200 York St.,
City.

¾″ Conduit service and to stove, old lighting system fed by ½″ Conduit service to basement but at diagonally opposite corner to point chosen for location of stove service.

Stove Installation Only

1	¾″ L L Condulet....	.21	
1	¾″ C Condulet.....	.15	
1	¾″ E Condulet.....	.16	
1	¾″ L B Condulet....	.21	
3	¾″ B M Covers.....	.14	
2	¾″ 3-hole Porc. C'vrs	.22	
1	¾″ 4-hole Porc. C'vrs	.12	
3	¾″ Locknuts.......	.02	
1	1″ Locknuts........	.02	
3	¾″ Bushings........	.06	
1	1″ Bushings.........	.04	
1	1″ x ¾″ Reducer....	.04	
10	¾″ Pipe Straps......	.10	
43	Ft. ¾″ Conduit.....	3.55	
10	Ft. ⅜″ Loom.......	.40	
16	Ft. No. 8 R.C. Wire..	.56	
155	Ft. No. 8 D.B. Wire..	6.20	
1	60 A. 250 V. Det. Box	5.80	
2	35 A. 250 V. Fuses...	.32	
2	Ground Clamps.....	.18	
9	No. 6 Terminals.....	.45	
1	Lb. Asbestos........	.15	
12	Ft. Lumber.........	.54	
			$19.64
Time	15 hrs. Labor at.	.32	
"	15 " " at.	.22	
Inspection	....	.60	8.70
			$27.34

Connecting Lighting to New Service

65	Ft. ¼″ Loom.......		1.63	
144	Ft. No. 14 R.C. Wire.		1.69	
25	Knobs..............		.19	
20	3″ Tubes...........		.10	
7	Federal Bushings....		.25	
1	3-2 D. Br. Cut-out...		.42	
1	10″ x 6″ x 4″ Iron Box		.45	
			4.73	
	Credit			
40	Ft. No. 12 D.B. Wire......	.80		
10	Knobs.........	.08		
10	3″ Tubes......	.05		
1	Double Det. Box	1.50		
16	Ft. ½″ Conduit	1.00		
			3.43	1.30
Time	3 hrs. Labor at..	.32		
"	3 " " at..	.22		
				1.62
				$31.26

May 9, 1917.

Mr. Wallace,
594 Talbot St.,
City.

To separate service into kitchen for stove, Lighting service not changed.

Stove Installation Only

1	¾″ F Condulet......	.37	
2	¾″ L B Condulet....	.42	
1	¾″ L L Condulet....	.21	
1	¾″ A Condulet.....	.11	
3	¾″ B M Covers.....	.14	
4	¾″ 3-hole Porc. C'vrs	.44	
3	¾″ Locknuts.......	.03	
3	¾″ Bushings........	.06	
6	¾″ Pipe Straps......	.06	
10	Ft. ¾″ Conduit.....	.83	
3	Ft. ⅜″ Loom.......	.12	
5	Ft. No. 14 R.C. Wire	.06	
16	Ft. No. 10 R.C. Wire	.32	
50	Ft. No. 8 R.C. Wire..	1.75	
28	Ft. No. 8 D.B. Wire..	1.12	
1	Service Box.........	1.50	
2	30 A. Fuse Plugs.....	.09	
6	No. 6 Terminals.....	.30	
3	A-2 Fed. Bushings...	.11	
4	Grd. Clamps........	.36	
1	Lb. Asbestos........	.15	
10	Ft. Lumber.........	.45	
		9.00	
			9.00
Time	9½ hrs. Labor at .30	2.85	
"	2½ " " .28	.70	
"	9½ " " .20	1.90	
"	2½ " " .20	.70	
Inspection	....	.60	
			6.75
			$15.75

June 8, 1917.

Mr. Watson,
122 Dreaney Ave.,
City.

Service for small stove with new circuit run to connect lighting.

Stove Installation Only

1	½″ F Condulet......	.23
2	½″ L L Condulet....	.31
1	½″ E Condulet......	.12
2	½″ B M Covers.....	.07
2	½″ 3-hole Porc. C'rs..	.08
2	½″ Locknuts........	.01
2	½″ Bushings........	.03
15	Ft. ½″ Conduit.....	.94
35	Ft. ¼″ Loom.......	.88
40	Ft. No. 12 R.C. Wire.	.40
25	Ft. No. 10 R.C. Wire.	.50
50	Ft. No. 10 D.B. Wire	1.25
25	Knobs..............	.19
1	30 A Can. Box.......	11.50
2	25 A Fuse Plugs.....	.09

3	No. 6 Terminals	.20	
1	Ground Clamp	.09	
1	Lb. Asbestos	.15	
12	Ft. Lumber	.54	
4	½″ Pipe Straps	.02	
			$17.60
Time 7 hrs. Labor at .22		1.54	
" 7 " " at .32		2.24	
Inspection		.60	
			4.38
			$21.98

Connecting Lighting to New Service

40	Ft. No. 14 Wire	.48	
1	6″ x 4″ 3″ Iron Box	.35	
1	2-2D Br. Cut-out	.40	
2	10″ A. Plugs	.10	
10	3″ Tubes	.05	
4	A-2 Fed. Bushings	.14	
			1.52
Time 2 hrs. Labor at .22		.44	
" 1 " " at .32		.32	.76
			$24.26

May 17, 1917.

Mr. Martin,
107 Marley Pl.,
City.

Ordinary ¾″ Stove service and Lighting circuit run up partitions to old cut-outs in second floor hall.

Stove Installation Only

1	1″ x ¾″ Bushing	.04	
1	1″ Bushing	.04	
3	¾″ Bushing	.06	
15	Ft. No. 10 R.C. Wire	.30	
125	Ft. No. 8 D.B. Wire	5.00	
3	¾″ B.M. Covers	.14	
1	¾″ C Condulet	.15	
1	¾″ E Condulet	.16	
1	¾″ L R Condulet	.21	
2	¾″ L B Condulet	.42	
1	¾″ F Condulet	.37	
1	1″ L. Nuts	.02	
3	¾″ L. Nuts	.02	
3	⅜ Loom	.12	
5	¾″ Straps	.05	
2	¾″ 3-hole Covers	.22	
1	¾″ Hole	.12	
2	35 A. 250 V. frame	.32	
1	60 A. 250 V. Det. Box	5.80	
2	Ground Clamps	.18	
2	No. 6 Terminals	.10	
30	Ft. ¾″ Conduit	2.48	
1	Lb. Asbestos	.15	
10	Ft. Lumber	.45	
			$16.92
Time 10 hrs. Labor at .32		3.52	
" 11 " " at .22		2.42	
Time Inspection		.60	
			6.54
			$23.46

Connecting Lighting to New Service

5	A-2 Federal Bushings	.18	
35	Knobs	.27	
12	No. 3 Tube	.06	
1	10″ x 6″ x 4″ Box	.45	
46	¼″ Loom	1.15	
125′	No. 14 R.C. Wire	1.50	
1	3-2 Dbl. Br. Cut-out	.42	
			4.03
Time 2 hrs. Labor at .32		.64	
" 2 " " at .22		.44	
			1.08
			$28.57

Getting Attention for a Window Display

AN electrical dealer in the Middle West pulled down the shade in his display window one night and installed what he thought was the best display of electric irons he had ever arranged.

"Bill," he remarked to his assistant, "I wish every man, woman and child who passes our place to-morrow would give this the once over."

"I can make 'em," assured Bill confidently. "Just cover the glass with wrapping paper and leave one little peep hole in it. Hang up a sign 'Line Forms on This Side,' and everybody will take his turn to look in."

And that's all there is to the story except that Bill did, and the crowd did, and so they sold a lot of irons. —*Electrical Merchandising.*

Lighting—Good and Not So Good

By F. F. Espenschied

DURING these days of conservation and economy, when power at many places is at a premium and sales efforts are temporarily lessened, it would seem well to look into the uses made of electric power.

The one which first strikes the senses, is lighting, the original object of electric power generation and still one of its chief uses.

To one travelling frequently in and out of Ontario and American cities and towns, two features are noticed. One is the fact that the average Ontario municipality is far better lighted than the average American municipality—that is, the street lighting is better distributed and more modern in Ontario. The other fact is that many American cities and towns seem to have better store and shop or commercial lighting layouts.

The reasons for these differences appear to be as follows:

In Ontario, the Commission, cooperating with municipal officials, has been consulted on layout or has specified much of the street lighting, and the results show the effect of thought on this important subject. Also the average Ontario municipality has a newer street lighting system than the corresponding American community.

Commercial lighting on the other hand, apparently has not received the same amount of attention on the part of the municipalities or their officials, and the Commission has not been in a position to consult on and work out individual lighting schemes.

Commercial lighting is in the hands of the building owner or tenant, whose knowledge of good and efficient lighting is usually very limited. The larger private companies in the United States have commercial lighting specialists who devote their time, usually free, we believe, to educating their customers in the matter of good lighting. The lack of such work in Ontario appears, therefore, to be the cause of our lower standard in this regard and we wish to point out how, at this time when power sales efforts are reduced, and lighting is so important, improvements can be made to result in better use of lighting and a higher standard of illumination.

There are three factors entering into the efficient use of light:

1. The proper location of light sources.

2. The proper fixtures, glassware, reflectors, etc.

3. The proper quantity and quality of light for the work to be done.

Each of these three features should be studied and a proper choice of all three will result in a minimum cost for power and renewals and a maximum effect in goods sold, work done or saleable material produced. The art of illu-

minating engineering is comparatively new and by many is not appreciated. It is not usually wise to leave the installation and purchase of important lighting equipment to the ordinary wireman or for the owner of the store or shop to make his own choice without first at least securing the advice of a competent lighting specialist. The essentials of illuminating engineering are not so difficult to grasp that the local manager or superintendent could not be of great assistance to his customers in this regard. In the larger places, some member of the engineering staff could be delegated to do this work at times when other work is not so pressing.

Even with the most modern equipment, however, proper maintenance and cleaning are necessary; maintaining efficient lighting is of sufficient importance to call for systematic care and attention on the part of the owner.

Bare lamps that injure the eye, insufficient light, incorrect glassware, strong gas-filled lamps, misused dirty, or old bulbs or fixtures, are real sources of loss to someone. There are so many examples of inefficient, to say nothing of inartistic lighting, that work in this field would produce profitable results. Many changes can be made at a very nominal first cost and some will result in a real power saving.

Efficient and artistic lighting has a real money value and more attention can profitably be given to this important subject. As a beginning, we would suggest that each municipality make a census of local lighting users with notes on defects, following this up by suggestions for remedying the worst cases at first. Public education along these lines is cumulative and a few good examples in any community with the assistance of the local management, will do much to improve the lighting in our stores, shops and factories. Window lighting comes under this same heading and many improvements would be made by shop owners if they can be shown that their trade will be increased by improving the appearance of their establishment.

The use made of power sold to any customers is important to the supply authorities and assistance on these matters is an important part of the service to the community.

Sell Immersion Heaters for Autos

THE sale of immersion heaters for preventing the freezing of water in automobile radiators offers a real selling opportunity for any energetic dealer north of the frost line!

If you are a car owner doing business with a local garage, you will have no difficulty in obtaining a list of prospects. A canvass during the course of a very cold evening will prove exceedingly productive of sales.

One of the big advantages of using immersion heaters, aside from preventing freezing of water in automobile radiators, is that no starting difficulty will be experienced because by the use of this heater the engine is kept warm continuously.—*Electrical Merchandising.*

Shall Municipalities Own Their Utilities

By A. G. Christie

The question of public ownership of utilities is of importance to industrial managers from two viewpoints: From that of purchasers of service for industrial plants, and from that of responsible members of a community. The conclusion reached in this article is that municipal ownership of utilities cannot be successful unless there has been considerable progress in local government, and unless there is a reasonable assurance that the following conditions will be fulfilled: an absolute separation of politics from utility administration; a hearty spirit of co-operation between the public and the utilities; sound financial and accounting methods; supervision by competent authority, as a state commission, and a "one-man control" with a competent trained executive in charge.—The Editors.

THE question asked in the title can only be answered with a reasonable degree of assurance after careful study has been given to two considerations: first, the character of the utility in question; and, second, the degree of intelligent leadership existing in the municipal government.

In the first place a distinction should be made between different utilities on the basis of the functions that they fulfill. Utilities may be divided into two classes that are not always distinctly separated from one another. The first class would include those supplying services connected with public health and sanitation, such for instance as water supply, sewage disposal, garbage removal, street cleaning and park maintenance. All such services are rendered for the benefit of the whole community. It is quite generally held that these utilities should be municipally owned and operated and such is usually the case. Hence, this class needs no further discussion. The second class includes those utilities that serve both public and private convenience and necessity. Among such are electric light and

power systems, gas works, street railways, etc. These provide some services absolutely demanded by the community, such as street lighting, transportation, and the like. However, their more important function is to supply special privileges and luxuries to certain classes of private citizens who pay for such in proportion to the service rendered. It is this revenue-earning service that makes these utilities attractive to financiers. My discussion of municipal ownership will therefore deal only with this second class of profit-producing utilities.

Let us first see what effect the city's location has had on the question of public ownership. A study of cities in Canada and the United States has produced interesting facts bearing on the question of location and organization. Municipal ownership in Canada, particularly in Western Canada, has met with a considerable measure of success. On the other hand, successful municipal ventures in similar utilities in cities of the United States have been relatively few in number, while many have proven partial or complete failures.

It is generally admitted that municipally owned utilities in the United States have failed to keep their plants modern and up-to-date and in consequence indifferent service has been provided. Their rates have been high as a result of the preceding conditions. They have usually lacked competent executives and have consequently been poorly organized and badly managed. Besides, politics have generally been a leading factor in their operation. Furthermore, their finances frequently were poorly handled and their accounting methods were crude and often misleading.

Canadian Experiences in Municipal Ownership

What then are the national or social considerations to which the successful management of the Canadian municipally owned utilities is due?

In the first place, British immigrants form a large proportion of the population in Western Canada. They were accustomed to municipal ownership in Britain and looked upon service on local boards as an honor. Their prominent business men sought, rather than shunned, civic responsibilities and introduced business methods into municipal affairs. Finally, the spoils system is directly opposed to British ideas of municipal government; hence, these immigrants exert a strong coercive influence to keep politics out of the utility's organization. These excellent British ideas of public responsibility have received ready acceptance from the Canadian and American elements of the population and are a characteristic part of the life of the cities.

Certain social considerations are also apparent in these cities. The West is a "young man's country" with optimistic and venturesome citizens. They are liberal in their views and are not afraid to try out new ideas. Besides, there are few vested interests to interfere with putting these ideas into effect and if certain obstacles do appear, means are readily found to overcome them.

The principal basis for the success of their municipal ventures is the spirit of co-operation that is a predominant characteristic of the people of these cities. It is a singular fact that those cities that have not developed this spirit to the fullest extent are the ones that have had troubles with political interference in the administration of their utilities. This co-operative idea has developed largely through the necessity of getting together to promote everything that would boom their section of the country and increase the value of their real estate and business interests.

One may question whether this fine co-operative spirit can be maintained. This is entirely a question of leadership. If the prominent men and women of a city have a public-spirited interest in municipal affairs and render helpful co-operation in governmental matters, other citizens will do the same. However, if only criticism is offered by the leaders, then the public will become suspicious and will soon adopt a hostile attitude toward the management of their own utilities. It is essential, therefore, for continued success in municipal control that this friendly co-operative spirit shall be maintained by the leaders of business and social life.

Finally, there is a lack of class distinction in the West. This results in a better mutual understanding and a wider range of interests between all members of these communities than in the older centres of the United States. Political machines are harder to build up and keep going under such conditions and there has apparently been less keen competition for positions in civic employ.

Several writers have pointed out that it may be quite possible to have modernly equipped plants, good service and efficient management in the rapidly growing and enthusiastic communities one finds in the West. Yet according to their views, such conditions will not be maintained as the cities grow older and their rate of growth slackens. Let us consider in this connection the activities of the Hydro-Electric Power Commission of Ontario. This Commission supplies power from Niagara Falls and other water powers to the municipal plants of a large number of towns and cities in the province and has proven a considerable success. Such evidence from the old province of Ontario indicates that success in municipal ownership is not due entirely to new conditions in urban life or to rapid growth of population, but rather to the executive capacity of those who are managing the undertaking and to the public support given to the venture in the municipalities.

Municipal vs. State Ownership

Some have favored state ownership and operation rather than municipal control. They hold that public utilities, if given a free hand, no longer confine themselves to the limits of a municipality. Suburban sections call for water and gas. Trolley lines serve outlying sections and even connect up cities. While electricity is probably supplied over a greater area from one source than any other utility, as a result of two

developments: the large central station, and hydro-electric power.

One of the chief economic developments of the past decade has been the growth of large electric central stations. These have been built in eminently suitable locations, and equipped with large efficient generating units. The current produced is transmitted at high voltage to transformers spread over a group of surrounding municipalities. Production costs are very low with such a central station, partly due to the large size of the equipment and partly to the diversity of the load.

Some examples approaching such state-wide service from central stations are the Public Service Corporation of New Jersey, and the Insull interests in Northern Illinois, though both systems are privately owned.

Municipally owned plants would encounter no technical difficulties in providing central-station service to surrounding districts. In doing this, however, one is at once confronted by a number of organization problems. The cost of such a station would be an unjust burden for one municipality to assume. If the cost is borne by all of the districts served there may be difficulties in apportioning it between the different communities. Then who will control the utility's policies and take charge of its operation? Petty jealousies between neighboring towns may make these arrangements very difficult. It is probable that such problems could be settled by state public-utility commissions.

Hydro-electric power has completely upset the idea of confining electrical service to city limits. It is usually transmitted long distances and may be delivered to several municipalities, as in California. There is a growing tendency in this country to regard water power as public property to be held by the government and used for the benefit of the people. State ownership and the development of hydro-electric power is directly in line with this idea. The system of the Hydro-electric Power Commission of Ontario is at present the leading example of such extensive state enterprise.

With these facts befofe us regarding central stations and water power, it is apparent that there is considerable justification for the belief that state ownership of electrical distribution has some distinct advantages.

But central-station service under private ownership has been quite a success, especially in those states with such public-utility commissions as Illinois and Wisconsin. Which then is more desirable, state ownership, or private ownership under commission control? Insufficient facts are available from which to draw any conclusions, but in the United States at least those now at hand tend to favor private ownership under stringent commission control.

Organization and Management of Municipal Utilities

The success or failure of a municipally owned utility depends very largely upon its management. Good executive control provides excellent organization and efficient service. Poor administration usually is

caused by political interference and results in unsatisfactory conditions.

I spent the summer of 1915 investigating the municipally owned electrical utilities of cities of Western Canada, after having made an extended study of the subject of public ownership, both here and abroad. Some of the technical and financial aspects of this investigation were presented in a recent paper before the American Institute of Electrical Engineers on "The Municipally-Operated Electrical Utilities of Western Canada."

Inquiries were made into the municipal systems of nine of the largest cities, all of which have municipal waterworks, sewage systems, hospitals and electric light and power services. Five have extensive municipally owned electric street railway systems. Some cities are engaged in still other municipal enterprises; for instance, Lethbridge operates a coal mine, Regina has its stock yards, and Medicine Hat sells natural gas.

This investigation revealed among other things the singular fact that those cities have been most successful where one man has been in charge of the utility for some time and has been directly responsible for its administration. On the other hand unsatisfactory conditions were found in those municipalities where changes of the utility's management were frequent and also where the city council undertook to dictate the utility's policies and to adjust its rates. The results have been almost disastrous where politics have had a part in the operation of the utility. It has also been the experience in the West that it is harder to keep street railways out of politics than electric light plants or gas works, for the more numerous employees can exert a greater political influence.

Several public-utility commissioners in the United States have stated that they have found as great need for regulation in municipally owned plants as in those under private control. They have also encountered great difficulty in definitely fixing responsibility for the execution of their orders in the case of municipal plants. The superintendent usually lacks authority and committees and city councils are notoriously irresponsible. Now with one-man-control there is positively no doubt regarding the responsibility for all business connected with the utility. Furthermore, full responsibility for results develops greater earnestness and initiative on the part of the executive and this tends to produce better and more economical service in the municipal plant.

Experience with municipal ownership in these Western cities further indicates that it is even desirable to have such an executive appointed rather than elective. In other words he should be chosen for his ability to do things rather than for his political popularity. It may not be good democracy to advocate appointive rather than elective officials, yet the facts before us seem to indicate that it produces the best results when accompanied by truly democratic city government.

Municipal Plant Equipment

Municipally owned utilities have been accused of being slow to adopt

improvements and of not keeping their plants up-to-date. This again is largely a question of management. Any competent executive who has reasonably free control of a utility will seize every opportunity to improve his equipment and also the quality of service, if this can be done economically.

Referring again to the Canadian cities, the rapid growth of the last decade has made large extensions necessary to all their electrical plants and hence these are equipped with up-to-date machinery. In fact, some of these plants are among the best equipped stations in America.

One would be inclined to expect that less care would be taken in the maintenance of a municipal plant with failing business than in one with normal service. But this is also true of privately owned plants under similar conditions, so that this cannot be regarded as a fault only of municipal control, although it has been one of the principal indictments of public ownership in the United States.

Financial Problems of Municipal Ownership

When a utility is in private hands, the management is continually striving to maintain rates and to increase profits. While the executive of a municipally owned utility endeavors to secure the best possible economies of operation, the margin of profit is kept small by continually lowering the rates to consumers. These consumers thus gain by any savings effected in the operation of the utility.

There is a fundamental difference between the methods of financing privately owned corporations and municipally owned utilities. In the case of the former, the necessary capital is raised by subscription from stockholders who do not expect that their money will be repaid except in dividends. Such capital is a permanent investment and does not have to be redeemed at any fixed future date.

Now, in municipal undertakings the capital necessary to start the utility must all be borrowed on the credit of the city and must necessarily be repaid at certain dates. Hence, debentures are sold to raise the money. The utility's executive is then under obligation to set aside each year certain sums out of revenue to meet the interest on these debentures and to maintain a yearly sinking fund deposit that will provide the necessary amount to retire the bonds at maturity.

Sinking Fund Problems

The yearly interest on bonds cannot be evaded and must be paid out of revenue. On the other hand, sinking fund deposits can be manipulated. If the revenues of a utility for a certain year have been unexpectedly small, a deficit may result if the full sinking fund deposits were made. Under such circumstances the management frequently sets aside a smaller sinking fund allowance than called for, hoping to make up the difference in more prosperous years. But this "make-up" is frequently deferred from year to year until finally an audit shows a considerable deficiency in funds. This deficit must then be made good either by increasing rates, by an addidional deben-

ture issue to cover deficiencies or by a general tax levied in the city.

Now at the time the shortage first occurred, consumers were supplied with service at less than full cost to the utility. If rates are increased to make up this deficiency, present consumers must pay more than true cost-of-service and they naturally object to such rates. An additional debenture issue is equally objectionable for it merely transfers the charge to future consumers. It is an absolute injustice to load this deficiency by a general tax levy on taxpayers who may not use the utility's services at all. The only fair and just system then is to make each year's service bear the total costs of that year.

Sinking funds are usually invested so as to earn compound interest. The proper investment of these funds is a matter of great difficulty and is usually left to members of some finance committee of the local council who, though well-intentioned men, often lack extensive financial experience and sometimes make serious mistakes. Unscrupulous politicians have occasionally had these funds placed so that they could derive personal gain from the investment. Frequently money has been loaned on real estate mortgages bearing high rates of interest, regardless of the element of risk involved in such investments. Satisfactory investments may be made in such securities as school district debentures, state bonds and even other securities of the home city.

However, if the term of the debentures exceeds the average life of that portion of the utility they are intended to cover, a depreciation fund must be maintained in addition to the sinking fund. The depreciation funds at the end of the equipment's life must equal the difference between the principal of the debenture issue and the total sinking funds on hand.

The responsibilities involved in handling sinking funds and depreciation funds have stimulated the introduction of serial bonds with terms adjusted to the life of the improvement they are intended to cover. With serial bonds an instalment of the principal is paid off each year, together with interest charges on all outstanding bonds. The cost to the consumer is the same in the end as with long term bonds, provided both classes of bonds can be sold at the same price which is now generally the case.

Serial bonds demand a positive yearly payment which cannot be evaded or shifted as in the case of sinking fund charges. Besides this, the risks, temptations and difficulties involved in sinking funds are entirely eliminated. With the term of such bonds adjusted to the life of the improvement, depreciation funds are unnecessary. Furthermore, such bonds relieve the local authorities of the responsibilities of handling large funds with the attendant worries and cares. Serial bonds seem therefore to be the logical securities to issue for municipally owned utilities.

Taxation of Publically Owned Utilities

Many people hold that municipally owned utilities should be tax-free because they are apparently the property of the people. The bare facts, however, do not support this view.

The services of any public utility may be divided into the three following general classes:

A. Municipal services to other than revenue-producing utilities. A municipal electric station would furnish power and lighting in municipal buildings, parks, streets, etc.

B. Municipal services for revenue-producing utilities. Thus an electric plant might supply power to street railways, to waterworks for domestic, supply, etc.

C. Private light and power consumers.

The services of class A are obviously for the benefit of the whole community and there is no justification for taxing the portions of the distribution system providing such services, or of the generating plant necessary to supply such demands.

Class B services provide privileges which may be of value to the city as a whole, but which are enjoyed only by certain portions of the citizens and are paid for in proportion to the use made of each particular utility. The uses of such special service should be expected to pay in their rates the just proportion of that part of the utility in question that is necessary to provide class B services.

The utility's plant occupies valuable city property; its distribution system uses the city's streets and alleys and enjoys police and fire protection provided by the city. It is obvious that customers of Class C enjoy special privileges provided by the city, in the use of the utility's services. They should therefore pay for these privileges by a tax on the proportionate part of the system supplying their demands. This tax really represents in the end the utility's just share of the general administrative and maintenance expenses of the city.

Rates Under Municipal Ownership

The rates to private consumers in many of these small towns under municipal ownership in the United States are arbitrarily fixed with no regard to actual cost. The town earns some revenue from these consumers but all additional money to maintain the plant and to meet fixed charges is drawn from the general taxation funds of the city in return for certain public services. This practice is wholly wrong, for in many cases consumers fail to pay their justly proportionate part for the service rendered and enjoy discriminatory rates. At the same time the city's taxpayers are often charged unduly large amounts for public services.

The only reasonable, fair and just way to charge for such public service is to measure it on meters and to bill the city at the same rates that are quoated to private consumers. The utility is then entirely self-supporting and its finances can be adequately separated from the city's other accounts. It amounts to an independent enterprise financed by the city.

The Canadian cities have operated their utilities on this basis and their rates to private customers have been as low and in some cases lower than those in cities of similar size in the United States with utilities under private control.

Available facts seem to indicate that with up-to-date equipment and

competent administration, rates should be as reasonable with municipal control as with private operation.

The Disposal of Surplus

The disposal of surplus when such exists has been a tough problem to municipalities. An analysis of the question indicated that the most equitable way to dispose of surplus is as follows. First, set aside a fund of moderate amount to meet extraordinary contingencies, such as fires, floods, and so forth, and deficits in bad years; second, utilize a portion to wipe obsolescent machinery off the books when such charges exist; and, third, dispose of any remainder as a proportional rebate on customers' bills at the end of the year. This plan obviates frequent changes of rates and has a marked psychological effect in keeping the consumer interested in the efficiency of the utility's operation.

Conclusions

It will now be apparent that many of the vital questions connected with municipal ownership of public utilities are those involving technical administration and financial control—questions that are entirely beyond the capacity of the average voter. Advocates of public ownership will do well to remember this and if municipal control is secured, they must be prepared to turn over such matters without question to those who are properly qualified and competent to deal with these problems. In other words, they must be prepared to substitute the exact knowledge of a trained manager for the bungling guesswork of the average politician.

The preceding discussion enables us to formulate an answer to the question that is asked in the title of this article—"Shall the municipalities own their utilities?" In view of conditions as they now exist in the United States, it is apparent that municipal ownership is not advisable unless considerable progress has been made in local government and there is a reasonable assurance that fulfillment may be expected of the following conditions: An absolute separation of politics from utility administration; a hearty spirit of friendly co-operation between the public and the utilities; sound financial and accounting methods; supervision by state commissions, and finally the most important consideration — "one-man-control" system with a competent trained executive in charge.—*Industrial Management.*

Electrical Christmas Tree

The city of Taylor, Tex., had a very unique community Christmas tree celebration, last year, says *Electrical Merchandising.*

A large tree was purchased from a near-by nursery and donated to the city. This tree was planted on the city hall park lawn and will be a permanent feature of the local Christmas celebration every year.

The tree was brilliantly lighted, the local electric company donating the cost of the wiring and lighting. Several thousand persons viewed the beautiful tree and witnessed the exercises.

Cooking Tests by Fuel and Electricity

By B. L. Steel

> Electricity in cooking is each month coming to the front in ever expanding uses. Comparative tests of coal, kerosene and electricity for cooking have long been lacking throughout the West, where wide applications of the electric range are but waiting the proper scientific exploitation of the power salesman. Here is an excellent article on this subject compiled by the author, who is Professor of Physics at the State College of Washington. The paper has been prepared for the convention of the Northwest Electric Light & Power Association, at Spokane.—The Editors.

THE results of comparative tests of coal, kerosene and electricity for cooking herein presented have been accumulated in connection with a special course in physics which the writer has given for several years at the State College of Washington for the students in the department of Home Economics.

The efficiency tests of gas, kerosene, gasoline and alcohol burners and of electric heating appliances have been made each year by the girls in this course and have been carefully repeated and checked by the writer and laboratory assistants. The tests on coal ranges were made on the two Monarch ranges in the Home Economics department, on the ranges in the homes of students living in Pullman, and at sorority houses. The cooking cost data were obtained at the Home Economics Practice Cottage.

Table No. 1 gives the value in calories, or the heat equivalent, of 5 cents worth of each of the various "fuels" at the prices prevailing in Pullman, Washington, in December, 1916.

Table No. 1

Fuel	Calories
Coal (Rock Springs) at $10. per ton	32,250,000
Kerosene at 20c. per gallon	8,550,000
Gasoline at 25c. per gallon	6,130,000
Alcohol at 75c. per gallon	1,340,000
Electricity at 3.85c. per kw.-hr	1,116,000

Table No. 2 gives the average efficiencies of the various kinds of cooking equipments. In determining the maximum efficiency of the coal range the entire top was covered with large vessels of water—e.g., wash boilers or five-gallon gasoline cans, the oven being similarly used. The fire was not lighted until the initial water temperature had been taken and usually two pounds of kindling and ten pounds of coal were completely burned before the record of the final maximum temperature was made. It was estimated that, as the coal range is used for cooking in the average home, not more than one-fourth of the available space is utilized at any one time and that the cooking operations are being carried on less than one-half of the time during which the coal is burning. If this estimate is correct, the average "cooking" efficiency of the coal range does not exceed two per cent.

Table No. 2

Kind of Cooking Equipment:	Efficiency
Coal range (entire space utilized)	18%
Coal range estimated home cooking (about)	2%
Flame contact burners (kerosene, etc.)	28%
Electric heaters, surface	45 to 65%
Electric heater, enclosed	70%
Electric heaters, immersion	90%

The efficiencies of the flame contact appliances, which include standard kerosene and gasoline blue flame burners, alcohol lamp for chafing dishes, and gas burners, varied from approximately 20 per cent. to 35 per cent. The caloric value of the various fuels were obtanied either from dealers or standard handbooks, or were determined in the laboratory.

Nearly every kind of electric heating appliance was used and under widely varying conditions. Room temperatures, existence of air currents from open windows, material and condition of surface of utensil used, wattage of heater, relative size of heater and utensil, and quantity of water heated, were all found to affect the efficiencies very considerably, particularly those of the sur-

Table No. 3

Items	Surface A	Heaters B	Enclosed Heater	Immersion Heater
Mass of water heated (grams)	4.536	4.536	2.268	1.360
Room temperature (Cent.).	21°C.	22°C.	21°C.	22°C.
Initial water temperature	18.2°C.	22.6°C.	16.4°C.	19.5°C.
Final water temperature	93.2°C.	96.5°C.	65.0°C.	92.0°C.
Temperature increase	75.0°C.	73.9°C.	48.6°C.	72.5°C.
Heat absorbed (calories)	340,200	335,200	110,225	98,600
Heater turned on	3:00	12:13	7:37	9:30
Heater turned off	3:32	12:58:30	8:33	9:46:49
Time in use (seconds)	1,920	2,730	3,360	1,009
Current (amperes)	10.32	8.69	1.63	4.00
Potential difference (volts)	115.0	115.0	110.0	110.0
Electric energy expended in heater (Joules)	2,278,656	2,730,000	602,448	443,960
*Heat equivalent of electric energy calories	544,221	652,000	143,880	106,033
Efficiency	62.5%	51.4%	76.6%	93.0%

*4187 Joules are equivalent to 1 calorie.

face and immersion types. In these experiments the thermometers, standard ammeters and voltmeters and the balances used were such and the care exercised was such, that a variation in efficiency greater than 1 per cent. was not to be attributed to accidental error.

Table No. 3 gives the data and results of several efficiency tests of electric heaters.

The average working efficiency of the electric range, as used in the home depends on so many factors that to make an accurate estimate is rather difficult. It is believed, however, that in the hands of those who have had a bit of experience in making the proper combinations of surface, enclosed and immersion heaters, the efficiency should be above 60 per cent.

Table No. 4 gives the heat available for cooking in 5 cents worth of each of the "fuels," proper allowance having been made for the working efficiencies of the various cooking appliances.

Table No. 4

Fuel	Calories
Coal (range at 2% efficiency)	623,000
Kerosene (range at 28% efficiency)	2,400,000
Gasoline (range at 28% efficiency)	1,716,000
Electricity (range at 60% efficiency)	: 669,600
Alcohol at 28% efficiency	375,200

For the purpose of affording laboratory work in the course in Household Administration, the Department of Home Economics at the State College at Washington maintains a Practice Cottage. The seniors each year are divided into groups of four students each, and each group, together with a chaperon, spends four weeks in the cottage. This arrangement permits each student to have the management of the cottage for one week. Before entering upon the month's work at the practice cottage, each of the four girls has made out a week's menus and has determined the necessary quantity of each article of food entering into each menu, according to the needs of the members of the group. The girls are "weighed in" at the beginning and "weighed out" at the end of the month and in most cases are found to have fared better than on their regular boarding house or home cooking.

During this year, through the generosity of the Washington Water Power Company, the practice cottage has been equipped with a Westinghouse electric range in addition to the coal range. This arrangement has made it possible to obtain data on the cost of cooking with coal and electricity for a family of five. During the winter when the furnace was in use, the water front of the coal range was disconnected, the hot water for domestic use being furnished entirely by the coil in the furnace. During the late spring the water front was connected up and all hot water needed was heated by the range in connection with the cooking.

In considering the results which follow, the fact that the work was carried on by students who were busy with other regular college work

must not be lost sight of, and it should be mentioned also that each of the 19 girls who lived in the cottage had had considerable experience cooking on the coal range and that none of them had had experience with the electric range. To help us out of this difficulty the Washington Water Power Company very generously offered the services of their expert, Miss Addison, who gave demonstrations to the groups on several occasions. Each student, whether cooking on the coal range with or without the water front or on the electric range, was instructed to practice economy as much as possible.

Table No. 5 gives the cost by meals of one week's cooking on the electric range, and Table No. 6 gives the week's menus. Two meters were provided, one for the oven and boiler, and one for the plate. The meters were read before and after each meal and in every case tenths of kilowatt-hours were carefully estimated.

During the month of December, 1916, the average value of a kilowatt-hour in Pullman was 3.85 cents. This value was used in calculating all the electric cooking costs.

Table No. 5—Electric Range

	KILOWATT HOURS					
	Breakfast		Lunch		Dinner	
Day	Oven	Plate	Oven	Plate	Oven	Plate
Monday	.5	.1	.7	.2	1.0	0.0
Tuesday	.7	.5	.5	0.0	.6	.4
Wednesday	.5	.1	.5	0.0	2.4	.7
Thursday	.6	0.0	1.0	0.0	1.4	0.0
Friday	.6	.2	.6	0.0	.3	.8
Saturday	0.0	1.0	.5	.2	2.0	.6
Sunday	0.0	.3	1.1	.4	0.0	0.0
Total kw.-hrs.	5.1		5.7		10.2	
Total cost (cents)	19.6		21.9		39.3	
Cost per meal	2.8		3.13		5.65	

Total cost for week.. 80.8 cents.
Average cost per meal.. 3.85 "

Table No. 6—Week's Menus, Electric Range

Day	Breakfast	Lunch	Dinner
Monday	Cream of wheat Corn Muffins Syrup, Coffee	Creamed Potato Bread and Butter Apple Sauce	Roast Pork, Potato Tomato, Apple Sauce Bread and Butter
Tuesday	Baked Apples Muffins, Coffee	Rice and Cream Bread and Butter Salad	Spaghetti and Cheese Fried Potato Buttered Carrots Cottage Pudding Bread and Butter
Wednesday	Graham Mush Rolls Coffee	Cheese Sandwich Apple Sauce Cake, Chocolate	Veal Loaf Baked Potato Creamed Onions Gravy Rolls, Jelly Cake Coffee

Thursday	Marmalade Rolls	Escalloped Potato Tea, Baked Apple Bread and Butter	Creamed Salmon on Toast Mashed Potato Bread and Butter Apple Pie
Friday	Muffins, Cereal Syrup, Coffee	Salad, Pudding Bread and Butter	Pork Chops Potatoes, Tomatoes Bread and Butter Custard
Saturday	Hot Cakes, Syrup Cereal, Coffee	Potato, Apples Onion Salad Rice and Cream Bread and Butter	Roast Pork Baked Potatoes Creamed Onion Gravy Bread and Butter Cream Cake, Coffee
Sunday	Fried Mush Toast	Bread and Butter Fruit, Cake	Veal Roast, Gravy Baked Potato Creamed Onion Bread and Butter Cream Cake, Coffee

Table No. 7—Coal Range, Water Front Disconnected

POUNDS

Day	Breakfast Wood	Breakfast Coal	Lunch Wood	Lunch Coal	Dinner Wood	Dinner Coal
Monday	3.00	8.00	2.00	6.00	3.50	6.00
Tuesday	3.00	5.00	2.25	6.00	3.00	6.50
Wednesday	4.00	4.00	3.00	4.50	3.25	6.25
Thursday	3.00	6.50	4.00	7.00	5.00	9.00
Friday	3.00	2.75	2.00	2.75	2.50	6.00
Saturday	2.00	1.75	6.00	2.00	5.75	5.00
Sunday	3.75	5.25	1.50	5.00	1.50	8.00
Total Pounds	21.75	33.25	20.75	33.25	24.50	46.75
*Cost (cents)	6.5	16.6	6.2	16.6	7.35	23.4
Total	23.1		22.8		30.8	
Cost per meal	3.3		3.25		4.4	

Total cost for week.......... 76.7 cents.
Average cost per meal.......... 3.65 "
*Value of 1 pound of wood, .3 cents; pound of coal.......... .5 "

Table No. 8 gives the cost by meals of a week's cooking on the coal range with the water front connected.

Table No. 8—Coal Range—Water Front Connected

POUNDS

Day	Breakfast Wood	Breakfast Coal	Lunch Wood	Lunch Coal	Dinner Wood	Dinner Coal
Monday	5.50	4.50	6.50	9.50	3.75	9.75
Tuesday	3.75	6.50	9.25	7.00	6.00	7.50
Wednesday	6.00	9.00	5.50	4.25	5.50	3.25
Thursday	4.00	2.00	9.00	9.75	9.00	9.75
Friday	4.50	9.75	4.50	5.00	5.50	13.50
Saturday	6.75	5.50	6.00	11.50	3.75	11.25
Sunday	9.25	15.25	5.00	0.00	3.00	18.00
Total pounds	39.75	52.50	45.75	47.00	36.50	73.00
Costs in cents	11.9	26.25	13.7	23.5	10.95	36.5
Total cents	38.15		37.2		47.45	
Cost per meal	5.45		5.3		6.78	

Total cost for week.......... $1.23
Average cost per meal.......... 5.85 cents.

In all, three weeks' cooking was done on the coal range with the water front disconnected, four weeks with the water front connected and five weeks with the electric range. Table No. 9 gives the average costs per week and per meal of this work.

Table No. 9

Equipment	Average Cost Per Week	Average Cost Per Meal
Coal range, W. F. connected	119.6 cents	5.70 cents
Coal range, W. F. disconnected	77.4 "	3.67 "
Electric Range	78.5 "	3.72 "

The results speak for themselves in general, but it might be pointed out from Table No. 8 that with the coal range it costs very nearly the same to cook breakfast or lunch as to cook dinner, while from Table No. 5 it is seen that the cost for breakfast, the lightest meal, is about half the cost of dinner. Also, from Table No. 9 it is seen that it costs 42.2 cents per week to heat the water for domestic use with the water front on the coal range.

The writer realizes fully that the amount of data presented is far too small to justify the making of any very sweeping inferences, but at the close of the coming year he hopes to have very complete results.

A Mission Window Display

TYPICAL of that section of the United States from which comes the product of the Hotpoint Electric Heating Company, of Ontario, California, is a very unique mission art window display.

This window display is a three-panel screen 3 feet high and more than 4 feet wide.

The centre panel of the display accommodates a 14-inch by 21-inch card featuring catchy sales talks on the appliances illustrated in the attractive posters used for the side panels. Eight of these cards are furnished with each display. The name of the dealer is printed just below the selling talk.

Sixteen very attractive posters, lithographed in five colors, are furnished for use in the side panels of the display. Each one depicts the use of Hotpoint appliances in the home. Two of these posters are to be displayed at a time—thus affording 8 changes for as many weeks.

With each display is also furnished a set of richly colored mats, harmonizing in color with the posters. These mats are to be used as a covering on the floor of the window, with a display of Hotpoint appliances placed thereon.

HYDRO NEWS ITEMS

Central Ontario System

GENERAL—It is proposed to serve the towns of Picton, Wellington and Bloomfield, in Prince Edward county, by means of a 44,000-volt line from Trenton. A sub-station will be erected at Wellington, for serving Wellington and Bloomfield, and a 4,000-volt line will be built from Wellington to Bloomfield. A sub-station will also be erected at Picton to serve this town.

BLOOMFIELD—The town of Bloomfield has passed enabling and money by-laws, 104 for to 4 against. It is proposed to issue debentures for the sum of $8,000 for the purpose of building a distributing system.

KINGSTON—The 44,000-volt line from Napanee to Kingston, which will serve Kingston, has been completed. The transformers for the Kingston sub-station will be installed and power supplied within the next thirty days. Work is progressing satisfactorily on the new addition to the waterworks pump house, which will house the new 3,500 G. P. M. motor-driven centrifugal pump. It is expected that this pump will be completed about the 5th of December.

OMEMEE—The new distribution system in Omemee is completed and it is expected that the transformers for the high tension station will be ready for shipment shortly.

PICTON—The town of Picton recently passed a Hydro enabling by-law. The present lighting plant is steam-operated and is the property of the municipality. It is proposed to close down the steam plant and change the distributing system over from three-wire, two-phase to three-phase. The municipality also proposes to install a motor-operated centrifugal waterworks pump of 1,000 G.P.M. capacity.

WELLINGTON—The town of Wellington has passed enabling and money by-laws, 202 for and 1 against. It is proposed to issue debentures for the sum of $10,000 for the purpose of buying out the existing system and remodelling it. The Niles estate, owners of the existing system, has agreed to sell the existing distributing system to the town for the sum of $3,000.

Northern System

NIPISSING—Arrangements are being made to put the new surge tank into service. This is being erected at the Nipissing Power House.

NORTH BAY—W. J. Wilkinson, formerly manager of the Northern System, with headquarters at North Bay, has resigned to accept a position as manager of the North Bay Toy Company. This company is at present erecting a large brick factory building and expects to use about 60 horsepower, probably beginning on the first of next year. H. D. Rothwell, one of the Commission's engineers employed in the Municipal Department, has accepted the position as manager, taking Mr. Wilkinson's place.

St. Lawrence System

PERTH — The municipality of Perth recently passed enabling and money by-laws by substantial majorities. It is proposed to raise $120,000 by municipal debentures and to purchase the local electric and waterworks plant from the present owners, the Canadian Electric and Water Power Company. The Commission proposes building a 26,400-volt transmission line between Perth and Smith's Falls, in order to supply the town with power. It is proposed to change over the present generating stations and distributing system from 133 cycles to standard, 60-cycle equipment.

MERRICKVILLE—The Rideau Power Company, of Merrickville, has requested the Commission to design and purchase the necessary high tension equipment for its power house, in order to supply power to the Commission.

SMITH'S FALLS—H. S. Shearer has been appointed manager of the Smith's Falls Hydro-Electric System. The municipality has arranged to take over the Citizens Electric Company's system and it is expected that the Smith's Falls Electric Power Company will be included as a part of the municipal system about the first of January.

The Commission is preparing to construct a 26,400-volt transmission line between Merrickville and Smith's Falls, to supply the latter municipality. The necessary material is on the ground and construction work will be commenced in the course of the next week or ten days.

The Commission has started work on the design of a 26,400 V. sub-station to serve the town of Smith's Falls.

Niagara System

BRIGDEN—The work of remodelling and extending the Brigden distribution system is completed, and it is expected that the distributing station will be finished within the next few days.

DRAYTON—The Commission has approved of the construction of a transmission line from Palmerston to Drayton, with a tap to supply the village of Moorefield.

OIL SPRINGS—The out-door substation and distribution system in Oil Springs are now complete ready for power to be turned on.

SANDWICH—The work of installing one of the 2,000 K.V.A. rotary converters in the salt company's plant at Sandwich is practically complete, and it is expected that this company will be in a position to use off peak power until after the winter peak on the system.

TORONTO—The Commission is arranging for the purchase of two 4,000 K.V.A. synchronous motors to be installed at Toronto for power factor correction on the Niagara System.

HYDRO MUNICIPALITIES

NIAGARA SYSTEM

25 Cycles.

	Pop.
Acton	1,735
Ailsa Craig	586
Ayr	800
Baden	710
Beachville	503
Blenheim	1,424
Bolton	727
Bothwell	703
Brampton	4,041
Brantford	25,420
Breslau	500
Burford	700
Burgessville	300
Caledonia	1,217
Chatham	12,863
Clinton	2,177
Comber	800
Dashwood	...
Delaware	350
Dorchester	400
Dresden	1,521
Drumbo	400
Dublin	...
Dundas	4,652
Dutton	870
Elmira	2,270
Elora	1,115
Embro	483
Exeter	1,572
Fergus	1,776
Forest	1,495
Galt	11,852
Georgetown	1,905
Goderich	4,655
Grantham Township	3,271
Granton	300
Guelph	16,735
Hagersville	1,105
Hamilton	100,461
Harriston	1,404
Hensall	749
Hespeler	2,740
Highgate	500
Ingersoll	5,176
Kitchener	19,266
Lambeth	350
Listowel	2,326
London	58,055
Lucan	662
Lynden	662
Milton	2,072
Milverton	893
Mimico	1,976
Mitchell	1,687
Mount Brydges	500
New Hamburg	1,543
New Toronto	1,136
Niagara Falls	11,147
Norwich	1,189
Otterville	500
Palmerston	1,843
Paris	4,370
Petrolia	3,891
Plattsville	550
Point Edward	899
Port Credit	1,046
Port Dalhousie	1,318
Port Stanley	849
Preston	4,643
Princeton	600
Ridgetown	2,326
Rockwood	650
Rodney	655
Sandwich	3,077
Sarnia	11,676
Seaforth	1,964
Simcoe	4,061
Springfield	442
St. Catharines	17,880
St. George	600
St. Jacobs	...
St. Mary's	3,953
St. Thomas	17,174
Stamford Twp.	3,418
Stratford	17,081
Strathroy	2,998
Streetsville	5[illegible]9
Tavistock	1,009
Thamesford	504
Thamesville	769
Thorndale	250
Tilbury	1,740
Tillsonburg	3,084
Toronto	463,705
Toronto Twp.	4,875
Walkerville	5,096
Wallaceburg	4,107
Waterdown	785
Waterford	1,133
Waterloo	4,956
Watford	1,221
Welland	7,243
Wellesley	...
West Lorne	724
Weston	2,156
Windsor	24,162
Woodbridge	639
Woodstock	10,084
Wyoming	544
Zurich	...
Total	974,271

SEVERN SYSTEM

60 Cycles.

Barrie	6,453
Camp Borden	...
Coldwater	579
Collingwood	6,361
Creemore	585
Elmvale	775
Midland	6,258
Orillia	7,448
Penetang	3,928
Port McNicoll	500
Stayner	972
Victoria Harbor	1,477
Waubaushene	600
Total	35,936

WASDELL'S SYSTEM

60 Cycles.

Beaverton	1,015
Brechin	215
Cannington	903
Sunderland	570
Woodville	388
Total	3,091

ST. LAWRENCE SYSTEM.

60 Cycles.

Brockville	9,428
Chesterville	854
Prescott	2,740
Williamsburg	100
Winchester	1,065
Total	14,187

EUGENIA SYSTEM

60 Cycles.

	Pop.
Alton	700
Artemesia Twp.	...
Arthur	1,041
Chatsworth	374
Chesley	1,975
Dundalk	721
Durham	1,600
Elmwood	500
Flesherton	428
Grand Valley	644
Hanover	3,221
Holstein	285
Horning's Mills	350
Markdale	989
Mount Forest	1,941
Orangeville	2,493
Owen Sound	11,910
Shelburne	1,115
Tara	590
Total	30,877

OTTAWA SYSTEM.

60 Cycles.

Ottawa	100,163

PORT ARTHUR SYSTEM.

60 Cycles.

Port Arthur	14,307

MUSKOKA SYSTEM

60 Cycles.

Gravenhurst	1,702
Huntsville	2,395
Total	4,097

CENTRAL ONTARIO SYSTEM.

60 Cycles.

Belleville	12,277
Bowmanville	3,655
Brighton	1,337
Cobourg	4,712
Colborne	1,012
Deseronto	2,221
Lindsay	7,481
Madoc	1,179
Millbrook	835
Napanee	2,926
Newburgh	486
Newcastle	611
Orono	700
Oshawa	8,240
Peterboro	20,426
Port Hope	4,649
Stirling	732
Trenton	5,000
Tweed	1,364
Whitby	2,864
Total	82,707

NORTHERN SYSTEM.

60 Cycles.

Callander	650
Nipissing	400
North Bay	9,855
Powassan	575
Total	11,480

THE aim of the Bulletin is to provide municipalities with a source of information regarding the activities of the Commission; to provide a medium through which matters of common interest may be discussed, and to promote a spirit of cooperation between Hydro Municipalities.